

UNITED STATES PATENT APPLICATION

FOR

INTERACTIVE, OFF-SCREEN ENTERTAINMENT GUIDE

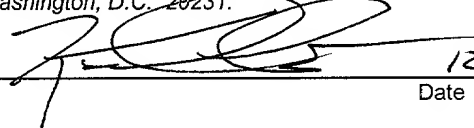
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INTERACTIVE, OFF-SCREEN ENTERTAINMENT GUIDE

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BACKGROUND OF THE INVENTION

RELATED APPLICATIONS

The present application is related to and claims priority from U.S. Provisional Application No. 60/238,585, entitled "Interactive, Off-Screen Entertainment Guide," filed October 6, 2000, with inventor Paul. G. Allen, which is hereby incorporated by reference in its entirety.

FIELD OF THE INVENTION

The present invention relates generally to electronic entertainment systems, and more particularly, to an interactive, off-screen, electronic programming guide.

DESCRIPTION OF THE BACKGROUND ART

In recent years, the television has arguably become the predominant entertainment medium. People with widely varied interests have found the television to be an indispensable source of information and entertainment. Indeed, with the advent of technologies and systems such as cable, satellite, and the Internet, television viewing options have expanded dramatically.

Unfortunately, the great proliferation of available channels can be more than a little confusing, and possibly somewhat daunting, for many viewers. Many viewers do not watch programming they would like to see, simply because they are not

aware of it. Others may set their video cassette recorders to record a specified program, only to find that a mistake in the recorder settings, or a change in programming, resulted in the wrong program being recorded.

Known methods of informing users of available programming have proved
5 to be deficient in many areas. Written programming guides, for example, require significant lead time to print and distribute. Consequently, programming changes that occur after printing are not reflected in the written programming guides. Additionally, a viewer must obtain a new programming guide periodically (e.g., weekly) in order to keep the written information current.

10 Another mechanism for informing users of available programming is an electronic programming guide (EPG). An EPG provides an on-screen listing of all programming and content that an interactive television service subscriber has available to them. Unfortunately, existing EPGs also present a number of difficulties.

For example, many such guides tend to occupy a substantial portion of
15 the television screen, or even the entire screen, so that a viewer cannot simultaneously view programs and the programming guide. A viewer, therefore, is unable to determine what is on other channels without interrupting the viewing of the current channel. This is especially problematic when there is a group of viewers, some of whom are intensely interested in the programming currently on the television, while others wish to see what
20 other programs are available.

Furthermore, guides that display programming schedules on the television are only able to display a limited amount of information at once. The low resolution of most standard televisions does not permit the display of more than a few time slots and channels. Furthermore, televisions are usually positioned far enough away from users
25 that smaller text is illegible, especially when the television, itself, is small. Thus, a viewer must manually scroll through several channels or time slots, or wait until the

channels or time slots scroll by, to find the particular programming in which he or she is interested.

Consequently, there is a need for a system and method for providing programming information to a viewer that overcomes the limitations of the prior art.

5 Such a system and method should preferably be self-updating and capable of displaying a considerable amount of information for a user, without interrupting program viewing.

SUMMARY OF THE INVENTION

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The present invention includes systems, methods, and devices for providing programming information that overcome the above-described problems and disadvantages.

15 In one aspect of the invention, an interactive television system includes a first display device, such as a television set, for displaying television signals. The system also includes a set top box for providing television signals to the first display device, as well as for obtaining television program schedule information. In addition, the system includes a remote control for controlling the set top box and the first display device.

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In one embodiment, the remote control includes a second display device, such as an integrated LCD display, for displaying the television program schedule information in the form of an electronic programming guide (EPG). The set top box includes, in one implementation, a wireless transmitter for transmitting the television program schedule information to a wireless receiver within the remote control.

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In another aspect of the invention, the remote control generates an interactive EPG for display on the second display device. The interactive EPG may include rows and columns corresponding to channels and time slots, respectively. In one embodiment, a user select may select a television program in the EPG in order to

display the program on a television or program a VCR or other recording device to record the program.

In still another aspect of the invention, a database containing television program schedule information is stored in a network, such as a broadband cable
5 network. In one embodiment, the set top box includes a network interface for accessing the database and receiving the television program schedule information from the network.

BRIEF DESCRIPTION OF THE DRAWINGS

10 Non-limiting and non-exhaustive embodiments of the present invention are described in the figures, in which

FIG. 1 is a diagram of a television network according to an embodiment of the invention;

FIG. 2 is a schematic block diagram of an interactive television system
15 according to an embodiment of the invention;

FIG. 3 is a schematic block diagram of a set top box according to an embodiment of the invention;

FIG. 4 is a schematic block diagram of a remote control according to an embodiment of the invention; and

20 FIG. 5 is a flowchart of a method for providing television program schedule information according to an embodiment of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

25 Embodiments of systems, methods, and devices for providing programming information and control for an interactive television system are described herein. In the following description, numerous specific details are provided, such as

examples of programming, user selections, transactions, etc., to provide a thorough understanding of embodiments of the invention. One skilled in the relevant art will recognize, however, that the invention can be practiced without one or more of the specific details, or with other methods, components, materials, etc. In other instances, well-known structures, materials, or operations are not shown or described in detail to avoid obscuring aspects of the invention.

Reference throughout this specification to "one embodiment" or "an embodiment" means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment of the present invention. Thus, the appearances of the phrases "in one embodiment" or "in an embodiment" in various places throughout this specification are not necessarily all referring to the same embodiment. Furthermore, the particular features, structures, or characteristics may be combined in any suitable manner in one or more embodiments.

Referring now to FIG. 1, there is shown a television network 100, such as a cable television (CATV) network, according to an embodiment of the invention. In one implementation, the network 100 includes a plurality of set top boxes 102 or other customer premises equipment (CPE) located, for instance, at customer homes.

A set top box 102 (hereinafter "STB 102") a consumer electronics device that serves as a gateway between a customer's television and a broadband communication network, such as a cable network. As its name implies, an STB 102 is typically located on top of, or in close proximity to, the customer's television. In general, an STB 102 relies on data streams encoded using the MPEG standard. STBs 102 are also capable of two-way data streams, allowing consumers to access services such as electronic shopping and video-on-demand.

In one embodiment, an STB 102 receives encoded television signals from the network 100 and decodes the same for display on the television. Additionally, an

STB 102 receives commands from a user (typically via a remote control) and transmits such commands back to the network 100.

In various embodiments, each STB 102 is connected to a headend 104. In the context of cable network, a headend 104 is a centrally-located facility where
5 CATV channels are received from a local CATV satellite downlink and packaged together for transmission to customer homes.

Headends 104 may be coupled directly to one another or through a network center 106. In some cases, headends 104 may be connected via a separate network, one particular example of which is Internet 108. Of course, the illustrated
10 network topology is provided for example purposes only, and other networks and network configurations may be used within the scope of the invention.

In one embodiment, a database 109 containing schedule information for television programming may be stored within one or more of the headends 104, network centers 106, the Internet 108, or a third party system coupled in one way or
15 another to the headends 104. The database 109 may include, for example, program channels, dates, times, critical reviews, content ratings, VCRPlus® codes, and the like.

In various embodiments, copies of the database 109 are periodically transmitted from the headends 104 or network centers 106 to the STBs 102 for local storage. For example, using a "carousel" technique, a headend 104 may be configured
20 to automatically send updated programming information to the STBs 102. In the carousel technique, a headend 104 sends a certain number of data packets including, for example, television program schedule information, in a particular sequence and then repeats the sequence at regular intervals.

Referring now to FIG. 2, there is shown an interactive television system
25 200 according to an embodiment of the invention. The interactive television system 200 includes, in one implementation, a television 202, an STB 102, and a remote control

204. In various embodiments, the system 100 may also include a video cassette recorder (VCR) 205 or other video recording device.

The television 202 may be configured to display television signals in a variety of formats, including standard analog or digital television formats or high-
5 definition television (HDTV) formats. The television 202 may utilize various technologies to display the television signals, such as standard cathode ray tube (CRT) technology, liquid crystal display (LCD) technology, liquid plasma technology, or projection techniques.

As illustrated, the television 202 is preferably coupled to an STB 102 in
10 order to receive and display television signals received from the network 100, and more specifically, from a headend 104. In one embodiment, the STB 102 includes a converter 206 for converting digitally-encoded (e.g., MPEG) television signals from the network 100 into format directly readable by the television 202. Additionally, as described in greater detail below, the converter 206 may decode television program
15 schedule information or other data received from the network 100.

In the illustrated embodiment, the STB 102 is equipped with a receiver 210, such as an infrared (IR) or radio frequency (RF) receiver 210. In alternative embodiments, the receiver 210 may be configured to receive other frequencies of the electromagnetic spectrum, such as UHF, VHF, microwave, or the like. The receiver 210
20 preferably receives control signals from the remote control 204 for operating the STB 102 and the television 202. The receiver 210 may also receive other types of data, such as information requests, e-mail, and the like, for transmission to the network 100.

In one implementation, the STB 102 also includes a transmitter 212, such as an IR or RF transmitter 212. The transmitter 212 is configured, in one embodiment,
25 to broadcast various types of information to the remote control 204, such as television program schedule information, responses to information requests, e-mail, and the like.

As noted, the remote control 204 provides convenient remote operation of the STB 102 and the television 202. Unlike conventional television remote controls, however, the remote control 204 includes a remote display device 220 for displaying an electronic programming guide (EPG), as described in greater detail below.

5 Preferably, the remote control 204 is of a size and weight convenient to be conveniently held in a viewer's hands or lap. In one embodiment, the remote control 204 may be approximately 8 inches wide and 11 inches tall, or about the size of a conventional paper notebook. Preferably, the remote control 204 is comparatively lightweight, for example, under three pounds.

10 In the illustrated embodiment, the remote control 204 includes a receiver 226, such as an RF or IR receiver 226, for receiving signals sent by the transmitter 212 of the STB 102. As mentioned above, these signals may include the television program schedule information retrieved by the STB 102 from the network 100. Additionally, the remote control 204 may include a transmitter 228, such as an RF, IR, or other
15 transmitter 228, that transmits control signals and other data to the receiver 210 of the STB 102, as well as to the television 202 (e.g., to adjust the television's volume).

In one embodiment, the transmitters 212, 228 modulate signals with a carrier frequency to enable transmission of information between the STB 102 and the remote control 204. For example, the transmitters 212, 228 may operate according to
20 the IEEE 802.11a or 802.11b Wireless Networking standards. Alternatively, the transmitters 212, 228 may rely on DECT or "Bluetooth" or other standard or proprietary protocols.

To achieve modulation and transmission, the transmitters 212, 228 may include various additional components not specifically illustrated. For example, the
25 transmitters 212, 228 may include source encoders to reduce the amount of bandwidth required, channel encoders to modulate the transmitted information with a carrier wave, and transmission antennas to actually broadcast the information. The antennas may be

substantially two-dimensional structures formed as part of a printed circuit board within the remote control 204 and STB 102. Such integrated antennas are advantageously compact and efficient to manufacture. The transmitters 212, 228 may further include amplifiers to increase the transmission signal strength to an appropriate power level.

5 The receivers 210, 226 may further include components not specifically illustrated but well known in the art. For example, the receivers 210, 226 may include antennas for receiving the transmission, amplifiers for increasing the strength of the received signal, and decoders for separating and demodulating information from the carrier signal. These antennas may also be integrated into printed circuit boards of the
10 remote control 204 and STB 102.

 As previously noted, the remote control includes, in one embodiment, a remote display device 220, which is preferably compact yet large enough to be easily readable. For example, a screen may have a 10.4 inch diagonal measure with a standard 4:3 aspect ratio. The remote display device 220 may be embodied as a
15 monochrome or color liquid crystal display (LCD) screen. To implement a color remote display device 220, a number of technologies may be utilized, including passive matrix, dual scan, HPA, TFT, or liquid plasma LCD technology. The remote display device 220 may advantageously utilize TFT LCD technology to achieve high brightness, clear motion, and a comparatively large viewing angle.

20 Display buttons 232 may be provided and conveniently located on the remote control 204 to control various aspects of the remote display device 220. The display buttons 232 may include buttons to vertically or horizontally scroll material on the remote display device 220, to adjust the brightness, contrast, and coloration of the remote display device 220, or to place the remote display device 220 in an "on," "off," or
25 "standby" setting. As used herein, the term "button" contemplates other types of controls, such as switches and the like. In addition, multiple buttons or controls may be provided for performing a particular function. Thus, the term "button" means one or

more controls for performing the stated function.

Additionally, control buttons 234 may also be provided on the remote control 204 to control the operation of the STB 102 and/or the television 202. The control buttons 234 may include channel selection, volume adjustment, power on/off, brightness, contrast, and coloration, and the like. The control buttons 234 may also be configured to control other devices, such as the VCR 205, a digital video disc (DVD) player, a compact disc (CD) player, a tuner, an amplifier, or a receiver.

In one embodiment, the remote display device 220 is adapted to present an interactive electronic programming guide (EPG) 240, which is generated from the television program schedule information received from the STB 102. One exemplary schema for an EPG 240 is depicted in FIG. 2. Channel fields 242 may be vertically arranged as rows, in ascending order, along the left edge of the remote display device 220. Each of the channel fields 242 may correspond to a single channel available from the network 100. Time slot fields 244 may be provided in columns to indicate which programs are on a given channel at a given time. In alternative embodiments, channel fields may be arranged as columns and time slot fields may be arranged as rows. A system for displaying television program schedule information is disclosed in U.S. Patent No. 5,532,754, entitled "Background Television Schedule System," which is incorporated herein by reference in its entirety.

Several time increments may be simultaneously depicted, as shown in FIG. 2. A viewer may thus obtain an overview of television program schedule information corresponding to the present time and for several hours thereafter without having to scroll the EPG 240 to view additional time increments. Nevertheless, a user may scroll the EPG 240 on the remote display device 220 vertically to see programming for additional channels, or horizontally, to see additional time slots.

Optionally, the remote display device 220 may provide touch sensitivity, which may be implemented using technologies well known or available to those skilled

in the art. Thus, a user may press against a particular portion of the screen with a finger or other object, such as a stylus, to select "virtual" buttons or controls displayed upon the device 220. If the remote display device 220 is configured as a touch screen, many, or possibly even all, of the buttons 232, 234 may not be needed.

5 In one embodiment, a viewer selects a television program to watch by touching a corresponding indication of the television program on the EPG 240. In one embodiment, a user may touch any location within a row to switch to the corresponding channel. Alternatively, the user may select a channel by means of the control buttons 234.

10 Likewise, the remote control 204 may be configured to program the VCR 205 or other recording device in response to the user touching an indication of the desired program in the EPG 240, rather than requiring the user to manually enter the channel, start time, stop time, etc. In one implementation, the remote control 204 transmits an appropriate VCRPlus® code from the database 109 to the VCR 205 in
15 response to a user selection of a program from the EPG 240. A viewer may thus rapidly program a VCR 205 with a much lower probability of error.

 Optionally, a user may activate an on-screen keyboard, by which a user may input letters, numbers, or other symbols. Such a configuration is particularly advantageous if a user wishes to use the remote control 204 to send e-mail or for other
20 text-based applications.

 The remote control 204 need not be limited to reception of television program schedule information, but may also be used for more varied, higher-bandwidth applications. For example, the STB 102 may be configured to send to the remote control 204 background information for television programs, such as pictures of actors
25 and actresses, video previews, and audio/video interviews with people associated with the program. In one embodiment, a secondary television signal may be sent to the

remote control 204 such that one viewer can watch a program on the remote display device 220 while another viewer watches a different program on the television 202. Similarly, a viewer may wish to convey higher-bandwidth information from the remote control 204 to other viewers connected to the network 100, such as a video or audio stream, captured by an integrated camera/microphone within the remote control 204.

In such an embodiment, the transmitters 212, 228 and receivers 210, 226 may be configured for high-bandwidth transmission and reception, which may rely, for example, on frequency division multiplexing (FDM) or other techniques. Transmission of video and audio between the STB 102 and the remote control 204 may rely on various standard protocols, such as MPEG and video over IP.

Referring to FIG. 3, there is shown an expanded block diagram of one possible embodiment of an STB 102. As shown in FIG. 3, the STB 102 may include a number of additional components beyond those depicted in FIG. 2. For example, the remote control 204 may include a storage interface 302, which provides an interface with a digital storage device 304, such as a hard disk drive or other memory device. In one embodiment, the storage interface 302 receives video/audio information, such as program previews and the like, from the converter 206 and delivers the same to the digital storage device 304 for storage thereof. When a user desires to review the stored video/audio information, the information may be transmitted through the transmitter 212 of the STB 102 to the receiver 226 of the remote control 204 for display on the remote display device 220.

In one embodiment, the STB 102 further includes a controller 306 that is in communication with the storage interface 302 and the converter 206. The controller 306 may be embodied as a microcontroller, microprocessor, digital signal processor (DSP) or other device known in the art. The controller 306 may manage the operation of the STB 102, including, for example, reception of the television program schedule information from the network 110, transmission of the television program schedule

information to the remote control 204, the storage and retrieval of supplemental video/audio information, etc. As noted above, the controller 306 may perform these and other operations based upon control signals generated by the remote control 204 and transmitted to the receiver 210.

5 In one embodiment, the STB 102 includes a separate network interface 308 for providing access to the network 100. The type of network interface 308 will vary depending on the underlying network 100. In a cable network, for instance, the network interface 308 may comprise a cable modem or the like. In alternative embodiments, the functionality of the network interface 308 may be provided by the converter 206.

10 FIG. 4 provides a more detailed, schematic representation of the remote control 204, including the receiver 210, transmitter 212, and the remote display device 220. As shown in FIG. 4, addition components may be included. For example, the remote control 204 may include a bus 402 to enable data transfers between the various components of the remote control 204.

15 The bus 402 may be electrically connected to random access memory, or RAM 404, configured to store data for temporary use, such as current television program schedule information. Similarly, a read-only memory, or ROM 406, may be provided to store more permanent data, such as fixed code and configuration data. In one embodiment, the ROM 406 may be configured to store an operating system for the
20 remote control 204.

 The remote control 204 may also include a processor 408 to for performing high-level processing functions, such as preparing and formatting the EPG 240 for display on the remote display device 220. The processor 408 may also sense a user's operation of the control buttons 234 or the "virtual" buttons displayed on the
25 remote display device 220 and generate appropriate command signals for transmission to the STB 102 and/or television 202. The processor 408 may be embodied as a microprocessor, microcontroller, digital signal processor (DSP), field programmable

gate array (FPGA), application-specific integrated circuit (ASIC), or other suitable device.

Additionally, the remote control 204 may include a digital storage device 410 for storage of schedule information, video/audio information, and the like. Like the
5 digital storage device 304 of the STB 102, the digital storage device 410 may be a hard disk drive or other memory storage device, such as "flash" memory.

The digital storage device 410 may also store an operating system for the remote control 204, such as Windows[®], Mac O/S[®], or UNIX[®]. In one embodiment, the operating system comprises a comparatively compact and customizable platform such
10 as Windows CE[®] or Linux[®]. The operating system may be configured to use the Wireless Application Protocol (WAP) to access information remotely from the STB 102 and/or the network 100.

Additionally, the remote control 204 may have a battery 412 to provide power for the remote control 204. Preferably, the battery 412 is a rechargeable battery
15 having a comparatively long life, such as 4 or more hours. The battery 412 may utilize various advanced storage technologies, such as Lithium Ion technology, to provide enhanced power output, durability, and recharge times.

The battery 412 may be recharged through the use of a power source 414. The power source 414 may be embodied in number of different configurations.
20 For example, the power source 414 may comprise a power cord designed to be plugged into a conventional, household power outlet. Alternatively, the power source 414 may be part of a charging unit (not shown), in which the remote control 204 may be stored and recharged. The power source 414 may then comprise contacts configured to mate with corresponding contacts of the charging unit. Alternatively, a magnetic
25 coupling, such as a transformer, may be used to energize the remote control 204 without the use of exposed electrical contacts on the remote control 204 or the charging

unit. The charging unit may hold the remote control 204 at an orientation convenient for viewing so that the remote control 204 can be used while in the charging unit.

Those skilled in the art will recognize that the various components of the remote control 204 may be embodied in a number of different configurations for ergonomics and ease-of-use.

Referring now to FIG. 5, there is shown a flowchart of one possible method 500 for obtaining and viewing television program schedule information in the form of an electronic programming guide (EPG) 240. The method 500 begins, in one embodiment, when a user activates 502 the remote control 204. As described above, the remote control 204 may be activated by pressing a designated button 232, 234.

In one embodiment, the remote control 204 transmits 504 a request signal to the STB 102 to request updated television program schedule information. In an alternative embodiment, the STB 102 may transmit updated information to the remote control 204 at regular intervals, obviating the need to make a specific request to the STB 102. In certain embodiments, the STB 102 may be in a "standby" mode until the request signal is received, in which case the STB 102 is placed in a "ready" or fully-functional mode in response to the request signal.

After receiving the request signal, the STB 102 may send 506 a request signal to the network 100 (e.g., headend 104, network center 106, or the Internet 108) to request updated television program schedule information from the database 109. In an alternative embodiment, as noted above, the STB 102 may receive information updates from the network 100 at regular intervals, obviating the need to make a specific request.

In one embodiment, the STB 102 receives 508 the updated television program schedule information from the network 100, which is then transmitted 510 to the remote control 204 using a wireless method, as described above. The remote control 204 receives and processes 512 the television program schedule information in

the processor 408 in order to generate the interactive electronic programming guide (EPG) 240. The remote control 204 then displays 514 the EPG 240 on the remote display device 220.

In one embodiment, a viewer may scroll the EPG 240 on the remote display device 220 to view additional channels or time slots. In various embodiments, the user may select filter settings for programming a user wishes to specifically include or exclude from the EPG 240, and the like.

In one implementation, the user may select 516 a program from the EPG 240 in order to change the channel displayed by the television 202, to program a VCR 205, or the like. In an embodiment in which the remote display device 220 is a touch screen, a user may simply touch an indication of a television program on the EPG 240 in order to display the program or schedule the recording of the program.

In view of the foregoing, the present invention offers numerous benefits not available in conventional approaches. By integrating a display device with a remote control 204, a user may conveniently check television program listings, without interfering with television viewing by other users. The database 109 of television program schedule information may be kept more current than conventional, printed entertainment guides. Indeed, in one embodiment, the database 109 may be maintained by the television and cable networks, providing the most accurate, up-to-date information available.

Moreover, the present invention provides an electronic programming guide (EPG) on the remote control, allowing a user to conveniently select one or more television programs to display on the television 202 or schedule for recording. In one embodiment, a touch screen interface is provided, whereby a user may easily select a program by touching an indication of the program in the EPG.

The above description of illustrated embodiments of the invention is not intended to be exhaustive or to limit the invention to the precise forms disclosed. While

specific embodiments of, and examples for, the invention are described herein for illustrative purposes, various equivalent modifications are possible within the scope of the invention, as those skilled in the relevant art will recognize.

- 5 These modifications can be made to the invention in light of the above detailed description. The terms used in the following claims should not be construed to limit the invention to the specific embodiments disclosed in the specification and the claims. Rather, the scope of the invention is to be determined by the following claims, which are to be construed in accordance with established doctrines of claim interpretation.